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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/783,208	02/14/2001	David M. Filgas	GSIL 0153 PUS	2784

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EXAMINER	
JACKSON, CORNELIUS H	

ART UNIT	PAPER NUMBER
2828	

DATE MAILED: 03/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/783,208	FILGAS, DAVID M.	
	Examiner	Art Unit	
	Cornelius H. Jackson	2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 November 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Paul Ip

PAUL IP
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Acknowledgment

1. Acknowledgment is made that applicant's Amendment, filed on 13 November 2003, has been entered. Upon entrance of the Amendment, claims 1-5, 10, 14, 15 and 21 were amended and claim 23 was canceled. Claims 1-22 are now pending in the current application.

Response to Arguments

2. Applicant's arguments, see page 7, filed 13 November 2003, with respect to the rejection(s)of claim(s) 1-22 have been fully considered and are not persuasive.

Applicant argued the following, the prior art of record fails to disclose, teach or suggest cooling a plurality of laser diodes where the laser diodes are electrically connected in parallel. In particular, Ullman discloses all diode laser arrangements of the module are electrically connected in series. Le Garrec discloses the diode arrays can be supplied electrically independently of one another ... in particular [using] a series-type supply.

In response, the prior art of record disclose, teach or suggest cooling a plurality of laser diodes where the laser diodes are electrically connected in parallel. Although, Ullman discloses all *diode laser arrangements* of the module are electrically connected in series, it is inherent that the plurality of laser diodes, each of the *diode laser arrangements* are comprised of, are electrically connected in parallel. Le Garrec

discloses the diode arrays can be supplied electrically independently of one another. Therefore *different types of electrical connections* can be envisaged, in particular [using] a series-type supply. To one of ordinary skill in the art at the time the invention was made could envisage a parallel electrical connection. Also with regard to Le Garrec, a diode array is a plurality of laser diodes which are connected in parallel.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-18, 20 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Ullman et al. (5903583). Regarding claim 1, Ullman et al. disclose a system for cooling a plurality of laser diodes **10** with a cooling fluid which does not come into direct contact with the at least one laser diode, the system comprising: providing a source of cooling fluid; positioning heat sinks **36** on opposing sides of each of laser diodes **10** wherein each of the two heat sinks has a passage **38, 39, 40** formed therein and therein the passages are in fluid communication with the source of the cooling fluid but not with the laser diodes **10**; and circulating the cooling fluid through the passages wherein heat is removed from the sides of the least one laser diode by conduction into the heat sinks and wherein heat is removed from the heat sinks by the cooling fluid via forced

convection, and the laser diodes **10** are electrically connected in parallel, **see col. 1, lines 10-14, col. 4, lines 3-13 and col. 9, lines 38-60**.

Regarding claim 5, Ullman et al. teach positioning heat sinks on opposing sides of each of the laser diodes **10** such that each heat sink **36** is in contact with a single laser diode **10**, **see Fig. 8 and col. 9, lines 38-60**.

Regarding claims 2 and 6, Ullman et al. teach electrically and thermally bonding the heat sinks to the laser diodes, **see col. 9, line 38-col. 10, line 43**.

Regarding claims 3, 7 and 8, Ullman et al. teach the heat sinks serve as electrical connections to and from the laser diodes and all the other stated limitations, **see col. 10, lines 13-67**.

Regarding claim 4 and 9, Ullman et al. teach a heat spreader **41** made of a material different than the material of the heat sink **36** to which the heat spreader **41** is attached and all the other stated limitations, **see col. 10, lines 56-67**.

Regarding claim 10, Ullman et al. teach a system **Fig. 8** for cooling at least one laser diode **4** with a cooling fluid which does not come into direct contact with the at least one laser diode, the system comprising: a source of cooling fluid; a plurality of heat sinks and a mechanism for circulating the cooling fluid, **see col. 9, lines 38-60**.

Regarding claim 15, Ullman et al. teach a system **Fig. 8** for cooling a plurality of laser diodes with a cooling fluid which does not come into direct contact with the array laser diodes, the system comprising: a source of cooling fluid; a plurality of heat sinks and a mechanism for circulating the cooling fluid, **see col. 9, lines 38-60**.

Regarding claims 11 and 16, Ullman et al. teach a flow inlet and a low outlet, **see col. 9, lines 38-60**.

Regarding claims 12, 13, 17 and 18, Ullman et al. teach a support structure, **49**.

Regarding claims 14 and 20, Ullman et al. teach all the stated limitations, **see col. 8, line 21-col. 9, line 3**.

Regarding claim 22, Ullman et al. teach all the stated limitations, **see col. 4, lines 1-23 and col. 8, line 21-col. 9, line 60**.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Le Garrec et al. (6091746). Le Garrec et al. teach a system for cooling at least one laser diode with a cooling fluid which does not come into direct contact with the laser diodes, the method comprising: providing a source of cooling fluid; positioning heat sinks on opposing sides of the laser diodes wherein one of the two heat sinks has a passage formed therein and therein the passages are in fluid communication with the source of the cooling fluid but not with the laser diodes; and circulating the cooling fluid through the passages wherein heat is removed from the sides of the laser diodes by conduction into the heat sinks and wherein heat is removed from the heat sinks by the cooling fluid

via forced convection, and the laser diodes are electrically connected in parallel, **see col. 3, line 54-col. 4, line 56**. Le Garrec et al. fails to teach each heat sink having a passage where there is fluid communication with the source of the cooling fluid but not with the at least one laser diode and circulating the cooling fluid through the passages wherein heat is removed formed in each heat sink, instead Le Garrec et al. teach for every pair of heat sinks, one heat exchange takes place by natural convection of the ambient air and other by circulating the cooling fluid through the passages, **see col. 1, lines 39-46**. It would have been an obvious matter of design choice to place a passage in the each of the heat sinks for heat exchange by convection of a cooling fluid, since applicant has not disclosed that by having fluid cooling on two opposing sides of the laser solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with heat exchange taking place by natural convection of the ambient air.

Regarding claim 5, Le Garrec et al. teach positioning heat sinks on opposing sides of each of the laser diodes **4** such that each heat sink **6 and 14** is in contact with a single laser diode **4**, **see col. 4, lines 16-24**.

Regarding claims 2 and 6, Le Garrec et al. teach electrically and thermally bonding the heat sinks to the laser diodes, **see col. 3, line 54-col. 4, line 9**.

Regarding claims 3 and 7, Le Garrec et al. teach the heat sinks serve as electrical connections to and from the laser diodes, **see col. 4, lines 13-14**.

Regarding claim 4, Le Garrec et al. teach a heat spreader made of a material different than the material of the heat sink to which the heat spreader is attached, **see col. 3, lines 54-63**.

Regarding claim 8, Le Garrec et al. teach all the stated limitations, **see col. 4, lines 41-56**. Also, it has been held to be within the general skill of a worker in the art to select a known material/arrangement on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Regarding claim 10, Le Garrec et al. teach a system **Fig. 1** for cooling at least one laser diode **4** with a cooling fluid which does not come into direct contact with the at least one laser diode, the system comprising: a source of cooling fluid; a plurality of heat sinks and a mechanism for circulating the cooling fluid, **see claim 1 above**.

Regarding claim 15, Le Garrec et al. teach a system **Fig. 1** for cooling an array of laser diodes with a cooling fluid which does not come into direct contact with the array laser diodes, the system comprising: a source of cooling fluid; a plurality of heat sinks and a mechanism for circulating the cooling fluid, **see claim 5 above**.

Regarding claims 11 and 16, Le Garrec et al. teach a flow inlet and a low outlet.

Regarding claims 12, 13, 17 and 18, Le Garrec et al. teach a support structure.

Regarding claims 14 and 20, Le Garrec et al. teach all the stated limitations, **see col. 3, line 54-col. 4, line 9**.

Regarding claim 19, Le Garrec et al. teach all the stated limitations, **see Fig. 1, reference number 52**.

Regarding claims 21-22, Le Garrec et al. teach all the stated limitations, **see 8 above**.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cornelius H. Jackson whose telephone number is (571)272-1942. The examiner can normally be reached on 8:00 - 5:00, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on (571)272-1941. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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